Benefiting from Supplier Supply Network Position: The Manufacturer Perspective

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Abstract - The position of a supplier in the supply network is emerging as one of the important aspects of supplier management, but the role of managing supplier supply network position in improving the performance of manufacturers still remains unclear. This paper examines the impact of supplier supply network position on manufacturer performance and stresses the mediating role of supplier capability and supplier performance. Using structural equation modeling (SEM), this paper empirically tests a number of hypothesized relationship based on the data collected from 228 Chinese manufacturers. Results indicate that supplier supply network position does not have any significant direct effects on manufacturer performance, however, supplier capability and supplier performance plays a fully mediating role between supplier network position and manufacturer purchasing performance.

Keywords - Manufacturer performance, supplier capability, supplier performance, supply network position

I. INTRODUCTION

In today’s business environment, reliance on supplier for manufacturing and innovation has become commonplace, the position of a supplier in supply network is emerging as one of important aspects of supplier management. In a supply network, supplier network position is defined as the outcome of the interaction relationships between a supplier and other actors, and then a supplier with the superior position in a supply network has more opportunities to learn from other actors and can access a large number of heterogeneous knowledge and information[1]. The network position also shapes the competitive priorities of a supplier and translates into resource advantage and capabilities. Thus a supplier with the superior position in a supply network can be expected to help its manufacturers obtain novel information and develop realistic marketing strategies[2,3].

Although existing researches have been realized that any supplier is embedded in a wide supply network, and suggested that the manufacturer should manage its suppliers in their structural network context, since the network surrounding of a supplier can affect the manufacturers’ business decisions, behavioral choices, and economic outcomes[3,4]. While current researches on supplier network position emphasized individual itself as the research object and focused on the relationship between supply network position and innovation performance, the benefits of supplier network position and its role in improving the performance of manufacturers remain poorly understood.

Thus, this study addresses the research questions: Does the supplier supply network position influence the performance of manufacturers? And if so, what's the mechanism? This remainder of this study is structured as follows. Section 2 reviews the theoretical background of this study. This is followed by the development of hypotheses. Next, we describe the research methodology and present the results. Finally, the last section draws some conclusions and suggestions for future research.

II. LITERATURE REVIEW AND HYPOTHESES

A. Supplier supply network position and manufacturer performance

Network position, a key variable of social network analysis, is the result of the interaction relationships between the actors in the network. With the deepening of the network research, scholars found that the various behavioral attributes of an actor, such as resource acquisition, strategy choice and innovation, can be interpreted as the function of its network position. The network position of an actor represents different opportunities to gain access to network resources and learn from other actors in the network, which plays an important role in operation and innovation of itself and partner firms.

Supplier supply network position refers to the structural position of a supplier in its supply network; it embodies the supplier’s status and power that relates to other actors in network, and represents the opportunities and capabilities to obtain network resources. The effect of supplier supply network position on the performance of manufacturers is mainly manifested in the following two aspects: First, a superior position in a supply network promotes supplier knowledge base and absorptive capacity, then creating favourable conditions to satisfy the diversification demands of process improvement and new product development of manufacturers. Second, a supplier with the superior position could transfer network resources to manufacturers through the close manufacturer-supplier relationship, manufacturers can recognize the potential market opportunities or threats and review the competitiveness level of existing products and production technology so that they can promote product improvement and improve operational and innovation performance accordingly. Research hypotheses based on the above analysis:

H1. The supply network position of a supplier has a significant positive effect on the performance of manufacturers.
B. Mediating role of supplier performance

A superior position can bring the abundant network resources to suppliers, but how to directly use suppliers’ network resources is difficult for manufacturers. Studies have shown that the contribution that a supplier made to manufacturers depends on its deliverables—supplier performance, which is achieved by the integration of internal and external network resources of supplier. Supplier performance means whether a supplier is able to dispatch products with the agreed quality, cost, flexibility and innovation on time. As the initially external input, supplier product attributes and service performance will affect the final output performance of manufacturer\[^{[5,6]}\]. Meanwhile, existing network research showed that a supplier with the superior position in a supply network could have opportunities to learn from other actors and gain access to new knowledge, which helped supplier provide the manufacturers with satisfying performance for a long time\[^{[7,8]}\]. Research hypotheses based on the above analysis:

H2. Supplier performance plays a mediating role in the relationship between supplier supply network position and manufacturer performance.

C. Mediating role of supplier capability

Supplier capability refers to the supplier’s ability to make use of its resources to meet the demands and business goals of manufacturers. From the perspective of the capability-based theory, supplier capability is a key factor to support its future business development and promote the improvement of manufacturer performance. There is the fact that different supplier capabilities can lead to different performance results\[^{[9]}\], and directly or indirectly affect manufacturers’ performance\[^{[10]}\]. Only when having expertise, technical skills and knowledge resources can a supplier create unique competitive advantage in terms of R&D, production, network relationship and strategic capabilities, and launch more innovative, cheaper products than its competitors. In addition, manufacturers would arouse interest in collaborating with suppliers that do possess superior capabilities in order to capitalize on such supplier capabilities, avoid the inherent risks that are associated with partnering with incapable supplier, and create collaboration performance.

At the same time, supplier supply network position correlates significantly with supplier capabilities. A superior position is beneficial to strengthen the possibility of supplier learning and promote the effective integration between internal and external resources of supplier in order to realize supplier technical innovation and products upgrades, and improve the capabilities to meet the various demands of manufacturers. Research hypotheses based on the above analysis:

H3a. Supplier capability plays a mediating role in the relationship between supplier supply network position and supplier performance.

H3b. Supplier capability plays a mediating role in the relationship between supplier supply network position and manufacturer performance.

III. METHODOLOGY

A. Sample and data collection

To test the hypotheses on a broad empirical basis, we surveyed a cross-sectional sample of manufacturing firms located in China by means of face-to-face, onsite interviews and mail survey. A total of 276 questionnaires were filled out, and 48 were returned as nondeliverable, leading to an effective respond rate of 82.6%.

B. Variable definitions and measurement

All constructs for measuring independent and dependent variables were developed on the basis of previous literatures. The concept of supplier supply network position (SSNP) was designed to consider supplier extended supply network (which companies the supplier is connected to and how the connected companies fare in their own business) and how a supplier was embedded in its supply network. Based on the work by Choi and Kim\[^{[3]}\], Gilsing et al.\[^{[11]}\], Tsai et al.\[^{[12]}\], Kim\[^{[13]}\], the SSNP scale measured using the five reflective items. Supplier capability (SC) scale was adapted from the prior research of Scheer et al.\[^{[14]}\]. In this study, two items assessed supplier’s product quality and delivery service, the other two items measured supplier capabilities in product improvement and new product design, the remaining two items evaluated the supplier capabilities to improve interaction quality and problem solving with the manufacturer through effective communication. The supplier performance (SP) scale was based on Ziggers and Henseler\[^{[15]}\], Carter\[^{[16]}\] and Shin et al.\[^{[17]}\], using the five reflective items. The manufacturer performance (MP) scale measuring used five items from Azadegan\[^{[18]}\]. All items were presented on 5-point Likert scales from 1= strongly disagree to 5= strongly agree.

C. Scale reliability and validity

TABLE I

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
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<tbody>
<tr>
<td>SSNP</td>
<td>0.792</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC</td>
<td>0.234**</td>
<td>0.784</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>0.355**</td>
<td>0.311**</td>
<td>0.721</td>
<td></td>
</tr>
<tr>
<td>MP</td>
<td>0.325**</td>
<td>0.360**</td>
<td>0.627**</td>
<td>0.718</td>
</tr>
<tr>
<td>Mean</td>
<td>4.0749</td>
<td>3.9250</td>
<td>4.0969</td>
<td>4.0676</td>
</tr>
<tr>
<td>S.D.</td>
<td>0.51175</td>
<td>0.58921</td>
<td>0.54743</td>
<td>0.43859</td>
</tr>
</tbody>
</table>

*significant at 0.05 level; **significant at 0.01 level.

This paper used Cronbach’s α and composite reliability (CR) to examine the reliability of each variable. Internal reliability was high, with Cronbach’s α values between 0.804 and 0.888 and CR values between 0.8087 and 0.8932 for the subscales. We applied confirmatory factors analysis to evaluate the validity of the constructs. The overall fit of measured model was good (χ²/df=1.3505; GFI=0.952; CFI=0.990; RMSEA=0.042), and the average variance extracted (AVE) for each variable value was above 0.5, indicating that all